

# 39 Equations

We are learning how to solve simple equations.

## NUMBER KNOWLEDGE

Numeracy Book 4  
Number Boggle  
Number Mats and Number Fans  
In and Out  
Multiplication Flash Cards  
Addition Flash Cards

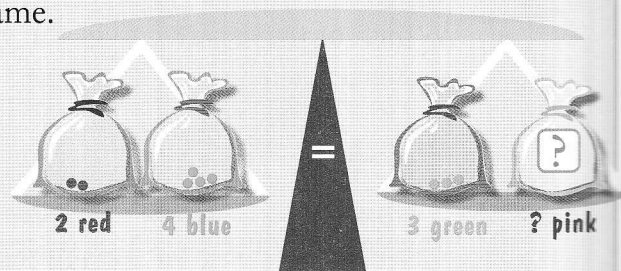
In this book  
Addition facts to decades ..... page 248  
Two, three, four, five and tens  
times tables ..... page 268  
Recording Calculations ..... page 273

## Balancing act



Counters, blocks, balance pans.

**Example** How many pink sweets must be put in the bag on the right-hand pan to make the scales balance?  
Each sweet weighs the same.  
Write an equation.

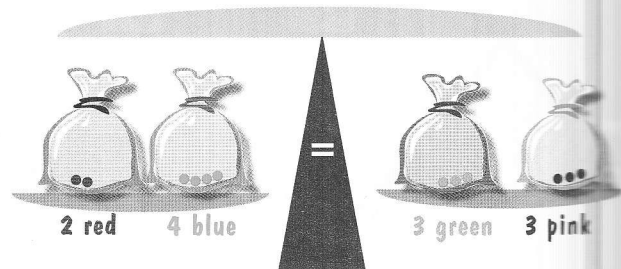


$$2 \text{ red sweets} + 4 \text{ blue sweets} = 3 \text{ green sweets} + \boxed{?} \text{ pink sweets}$$

$$6 \text{ sweets} = 3 \text{ sweets} + \boxed{?} \text{ sweets}$$

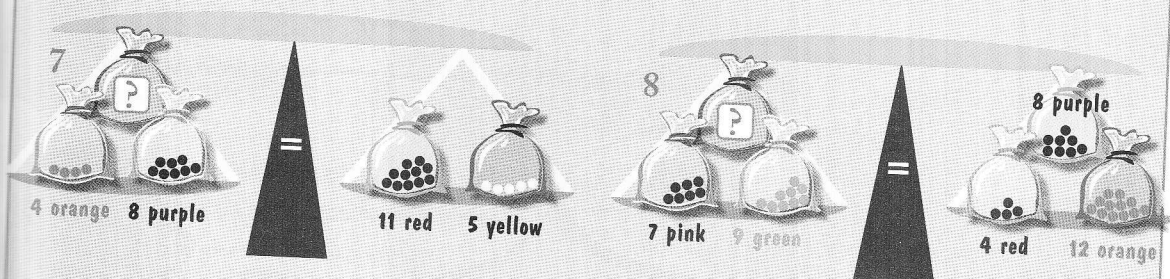
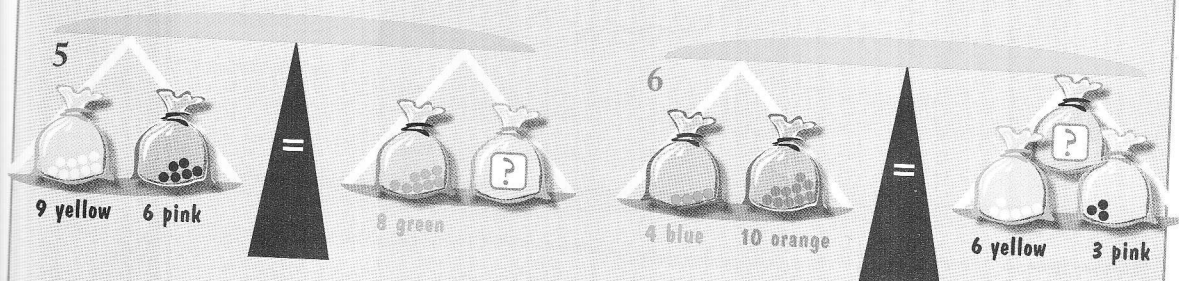
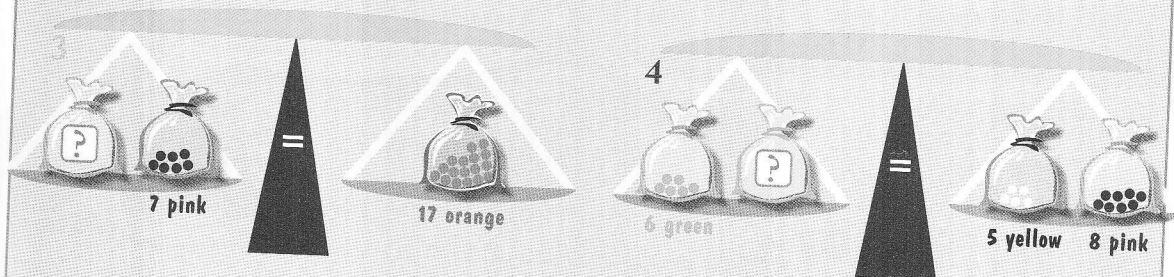
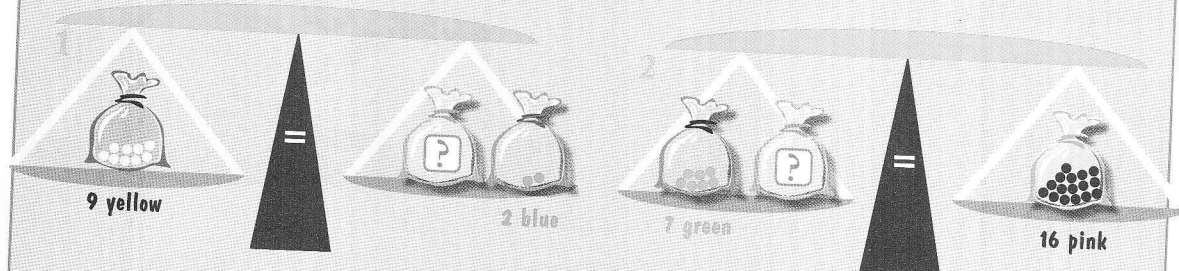
$$6 \text{ sweets} = 3 \text{ sweets} + 3 \text{ sweets}$$

3 pink sweets must be put in the bag.



The equals sign tells you that the number of sweets must be the same on both sides.

How many sweets must be put in the empty bag to make these scales balance?  
 Each sweet is the same weight.  
 Write an equation for each one.



### Example

What number goes in the box to make this equation true?

$$8 + \boxed{?} = 11$$

$$8 + \boxed{?} = 11$$

$$8 + \boxed{3} = 11$$

The number in the box must be 3 to make the equation true.



### Activity



Remember the equals sign means that the total on each side should be the same.

- 1 These equations were given to Sam for homework. Which numbers go in the boxes to make these true?

### Homework

a  $5 + \boxed{?} = 9$

b  $8 + \boxed{?} = 12$

c  $10 = \boxed{?} + 4$

d  $10 - \boxed{?} = 4$

e  $12 - \boxed{?} = 7$

f  $7 = \boxed{?} - 3$

g  $\boxed{?} + 7 = 18$

h  $17 = 9 + \boxed{?}$

i  $15 - \boxed{?} = 6$



### 2 Challenge

What number goes in the box so both sides of the equation have the same total?

a  $5 + 6 = \boxed{?} + 7$

b  $\boxed{?} + 4 = 8 + 6$

c  $9 + 7 = 12 + \boxed{?}$



3



I think that  $7 = 4 + 3$  is true because both sides of the equals sign have the same total.

I think that  $7 = 4 + 3$  is false because 7 is the answer to  $4 + 3$  so it must be written on the right-hand side.

Discuss Sam's and Nico's statements with a partner.



4 What goes in the boxes to make these true?

a  $9 + \boxed{?} = 23$

b  $18 + \boxed{?} = 25$

c  $13 = 20 - \boxed{?}$

d  $35 - \boxed{?} = 23$

e  $4 + 5 = 6 + \boxed{?}$

f  $\boxed{?} + 4 = 7 + 3$

g  $12 + 4 = \boxed{?} + 3$

h  $7 + \boxed{?} = 9 + 5$

i  $8 - 3 = 10 - \boxed{?}$

j  $9 - \boxed{?} = 12 - 3$

k  $\boxed{?} + 3 = 12 - 8$

l  $13 - 7 = 10 - \boxed{?}$

5 Discuss with a partner whether these are true or false.

a  $4 + 8 = 12$

b  $9 = 4 + 5$

c  $8 = 12 - 3$

d  $8 + 3 = 11 + 3$

e  $16 + 4 = 20 - 4$

f  $3 + 17 = 24 - 4$

g  $25 - 5 = 4 \times 5$

h  $32 + 9 = 9 + 32$

i  $6 \times 1 = 7$

6 Millee's class was given this equation.

The pupils were asked which number goes in the box to make it true.

$5 + 4 = \boxed{?} + 3$



I think it is 9.

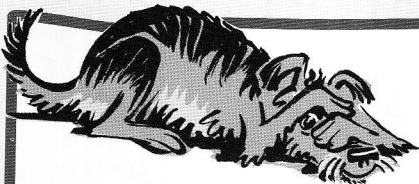


I think it is 6.



I think it is 12.

Who do you think has the right answer?  
Justify your choice to a classmate.



7 Challenge

$\boxed{?} + 5 = 11$

Discuss with a partner whether the statements on Baxter's poster are true or false.  
Justify your answers.

A  $\boxed{?}$  must be bigger than 11.

B  $\boxed{?}$  must be smaller than 11.

C  $\boxed{?} = 11$ .

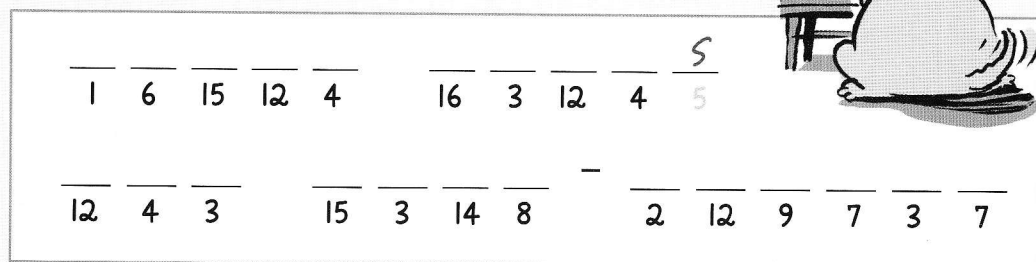
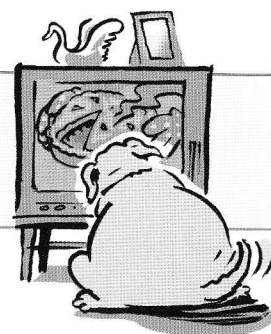
D  $\boxed{?}$  must be bigger than 5.

E  $\boxed{?}$  must be less than 5.



# 8 Did you know that ...?

Copy this diagram into your book.



Find the number that goes in each box to make the number sentence true. Put the letter beside the question above its answer on your diagram. The first one has been done for you.



S  $6 + 4 = \boxed{5} + 5$

O  $6 + \boxed{?} = 9 + 3$

D  $\boxed{?} + 2 = 4 + 5$

A  $9 + 7 = 4 + \boxed{?}$

E  $8 + \boxed{?} = 17 - 6$

N  $\boxed{?} + 5 = 8 + 6$

P  $2 \times 4 = 7 + \boxed{?}$

H  $11 - \boxed{?} = 3 \times 3$

R  $3 \times \boxed{?} = 16 - 4$

B  $87 + \boxed{?} = 16 + 87$

T  $32 + \boxed{?} = 8 \times 5$

L  $8 \times 3 = \boxed{?} + 9$

F  $135 + 14 = 135 + \boxed{?}$

9 a Write down the number that goes in each box to make the number sentence true.

i  $5 + \boxed{?} = 5$

ii  $8 + \boxed{?} = 8$

iii  $\boxed{?} + 12 = 12$

iv  $64 + \boxed{?} = 64$

v  $6 \times \boxed{?} = 6$

vi  $\boxed{?} \times 9 = 9$

vii  $15 \times \boxed{?} = 15$

viii  $\boxed{?} \times 124 = 124$

b Discuss with a classmate what you notice about adding 0. Write down what you can say is always true.

c Discuss what is always true when you multiply by 1. Write it down.



10 Copy these equations and fill in the missing sign ( + or - or  $\times$  ) that makes each equation true.

a  $8 \square 4 = 12$

b  $5 \square 3 = 15$

c  $9 \square 3 = 3 + 3$

d  $2 \square 4 = 12 - 4$

e  $3 + 12 = 3 \square 5$

f  $1 \square 8 = 8$

g  $0 \square 9 = 9$

h  $20 \square 16 = 6 \square 30$

i  $38 \square 14 = 40 \square 12$

11

*There were 4 cats  
and 2 dogs waiting  
to see the vet.  
How many animals  
were waiting?*

I wrote this equation  
for the story  
 $4 + 2 = 6$ .



Write a number sentence for each of these stories.

- a A giant apple had 5 worms inside it.  
There were 3 more worms on the outside of it.  
How many worms were there altogether?

- b Millee put 12 slices of mango on a plate.  
7 of these were eaten.  
How many were left?

- c A bowl of fruit had 3 bananas,  
4 pears and 3 kiwi fruit.  
How many pieces of fruit were in the bowl?

- d There were 24 plums on one branch and 8 on another branch.  
Sam picked 20 of them.  
How many plums were left on the two branches?

- e Millee took 15 oranges to share at camp.  
Her friends ate 5 of them in the bus on the way to camp.  
Millee ate 2 more herself.  
Her tent mates ate another 3.  
How many oranges were left?



12 Write a story for each of these number sentences.

a  $6 + 9 = 15$

b  $4 + 7 + 5 = 16$

c  $3 + 8 - 7 = 4$



13 a



I can write 10 in lots of different ways.



I did "Investigating Rods" on the next page first to help me with this question.

$10 = 2 + 8$

$10 = 2 + 3 + 5$

$10 = 16 - 6$

$10 = 3 \times 4 - 2$

$10 = 100 \div 10$

Write 10 in at least five more ways.



b Write these numbers in at least five ways.

i 20    ii 12    iii 38    iv 73    v 125

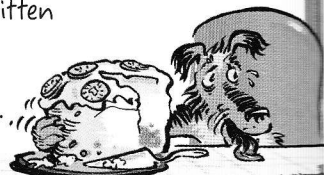
How many different ways has your group found?

Include some that have  $\times$  and  $\div$  in them as well as  $+$  and  $-$ .



14 Challenge

- a Is it possible to write down all of the ways 37 can be written using just one addition sign? Explain your thinking.
- b What about two addition signs? Explain using examples.



Shape magic



1 Work out the numbers that the shapes in each pair of equations stand for.

a  $\star + \star = 8$

b  $\heartsuit + \heartsuit = 14$

c  $\smiley + \smiley = 12$

$\crescent + \star = 9$

$\triangle + \heartsuit = 10$

$\smiley + \blacksquare = 14$

2 Work out what  $\blacklozenge$  and  $\bigcirc$  stand for if

$\bigcirc + \blacklozenge = 11$

and  $\bigcirc - \blacklozenge = 7$

Each symbol stands for a different number.

